

# **RTO #4**

## **Strategic Planning and Replanning Concept Development**

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**METRON**

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# Objective

**Develop a Flight Deck/AOC strategic flight planning (and replanning) concept including:**

- Functional design of concept**
- Detail flight crew/dispatcher interaction**

# Task(s)

- **Survey of Dispatcher-related inefficiency in flight planning and replanning**
- **Post-Operations Evaluation Tool (Metron), an examination of replanning inefficiency (uses Airline and ETMS data for the same flights)**
- **Ultimate Flight Planner, developed a specification for a flight planning DST that can be hosted on the ground or in an aircraft**

# Results (WWW Analysis)

Link Placed on Airline Dispatch Federation Home Page

[www.dispatcher.org](http://www.dispatcher.org)

## Dispatcher Demographics

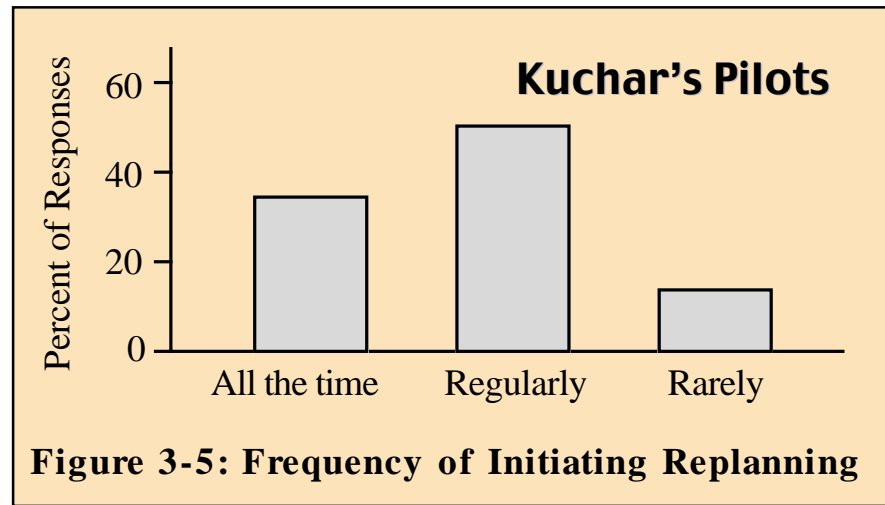
Experience Level		Average	Standard Deviation
"Low Time"	N=41	3.6 Years	2.3 Years
"High Time"	N=31	18.3 Years	7.6 Years

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# Results (WWW Analysis)

## Frequency of “Replan” Events

Dispatcher Experience	Percentage of Flights Replanned	Percentage of Replanned Flight that Require Replanning
Low Time (<10 yrs)	10% (SD 9%)	7% (SD 12%)
High Time (>10 yrs)	18% (SD 17%)	11% (SD 12%)



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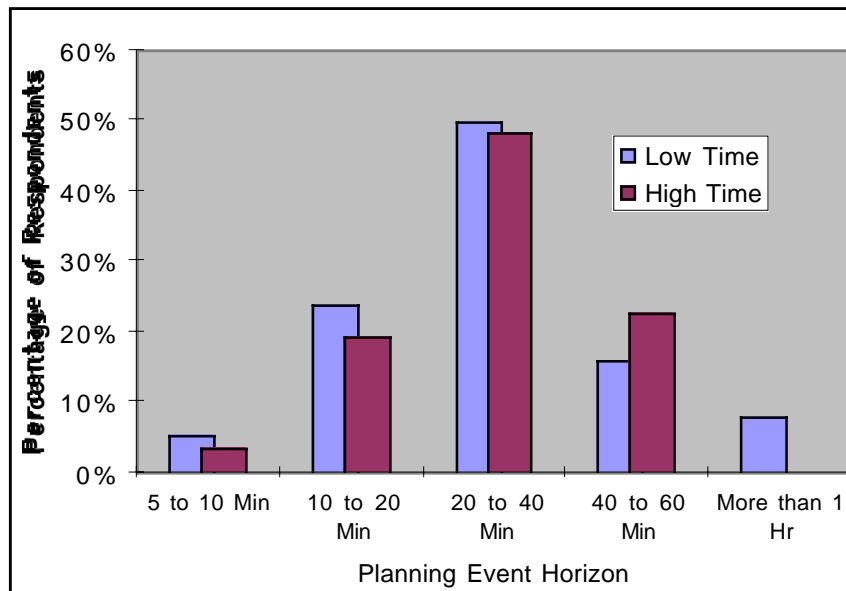
# Results (WWW Analysis)

## Kuchar's Pilots

**Table 3-5: Mean Delay Between Diversion Decision and Request to ATC**

Time Horizon	Median Frequency	Standard Deviation
< 1 minute	0.5	0.36
1 - 5 minutes	0.4	0.29
5 - 30 minutes	0.1	0.23
> 30 minutes	0	0.08

## Diversion/Replan Event Horizon

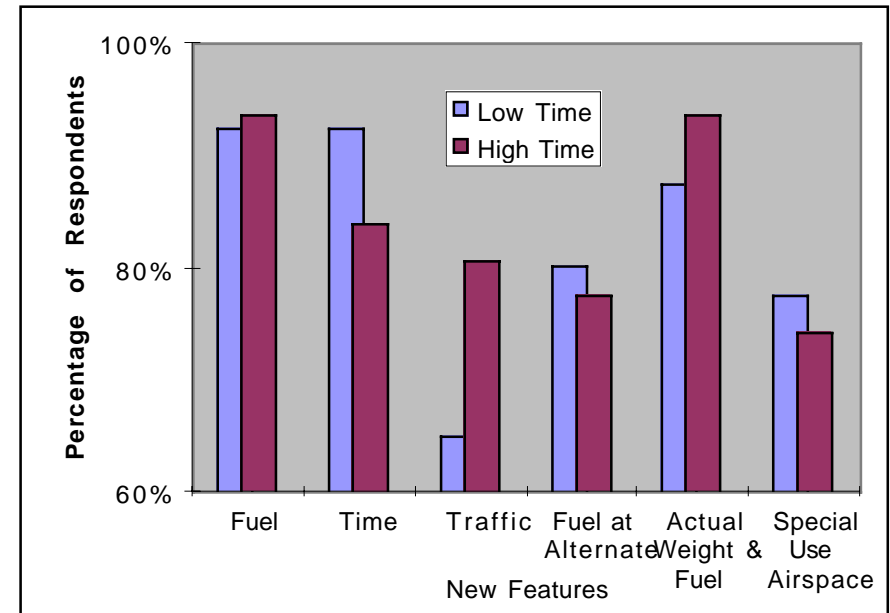
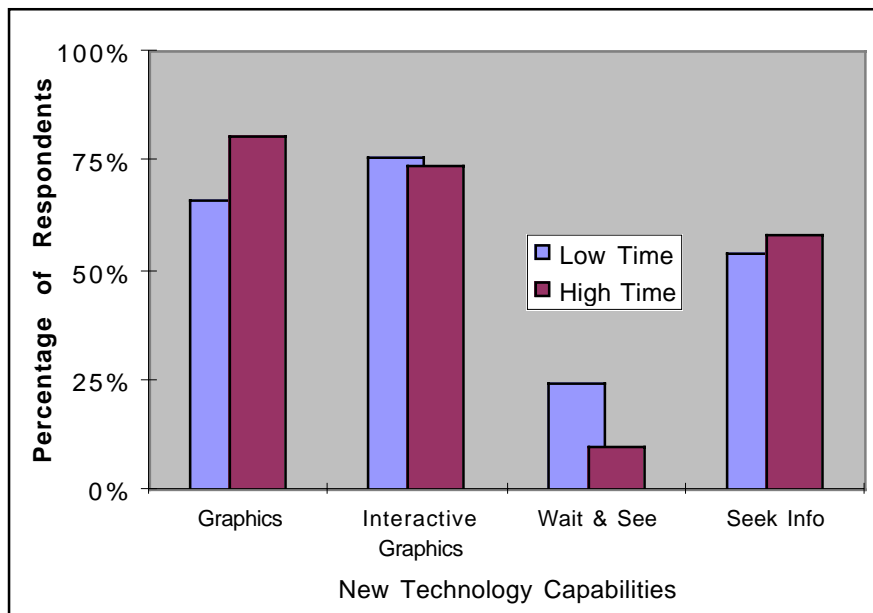


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# Results (WWW Analysis)

**If only I could've had a \_\_\_\_?**

*What Dispatchers want for Automation (DST) improvements.*



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# Results (POET Analysis)

## Eastbound vs. Westbound Flights

In our analysis we found that *eastbound flights were inefficient significantly more often than westbound flights*. This trend appears to occur throughout the NAS, and not in specific regions. One possible explanation is that westbound flights want to avoid the jet stream (headwinds) which is easier to do and less affected by reroutes (because there is more space outside the jet stream). In contrast, eastbound flights trying to take advantage of the jet stream (tailwinds) may be more sensitive to reroutes taking them out of the favorable wind pattern. This explanation is tentative and requires further investigation.

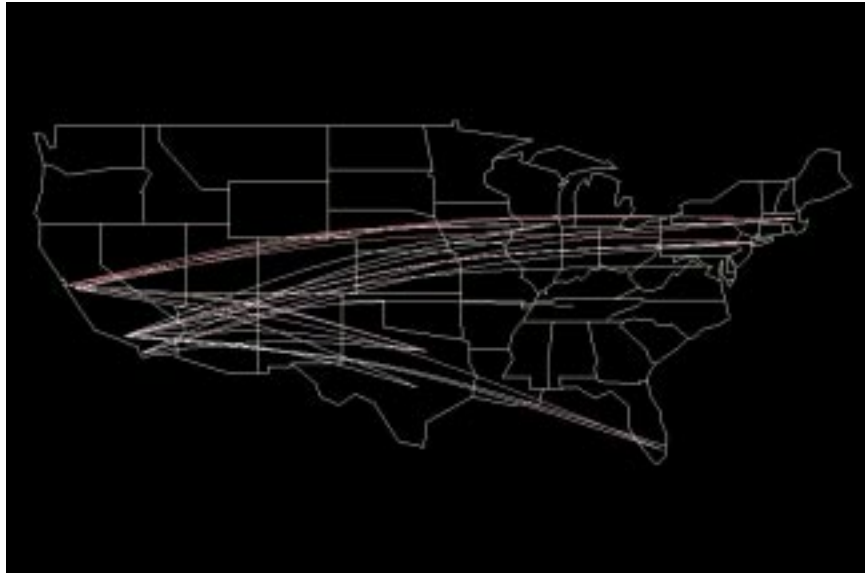
## Reroute Inefficiencies

We looked at the correlation between inefficient flights and flights that were significantly rerouted and found that *the significant rerouting of a flight is not a strong predictor of its inefficiency*. We found that over half of the inefficient flights were not significantly rerouted. Conversely, we found that only fifteen percent of the rerouted flights were inefficient compared to thirteen percent for all flights. Significant reroutes do appear to be a contributing factor to inefficiency, but not the primary cause.

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# Results (POET Analysis)



**Westbound flights to CA airports**

**White = 0% inefficient**

**Full red = 50% inefficient**



**Eastbound flights from CA airports**

**White = 0% inefficient**

**Full red = 50% inefficient**

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# Results (POET Analysis)



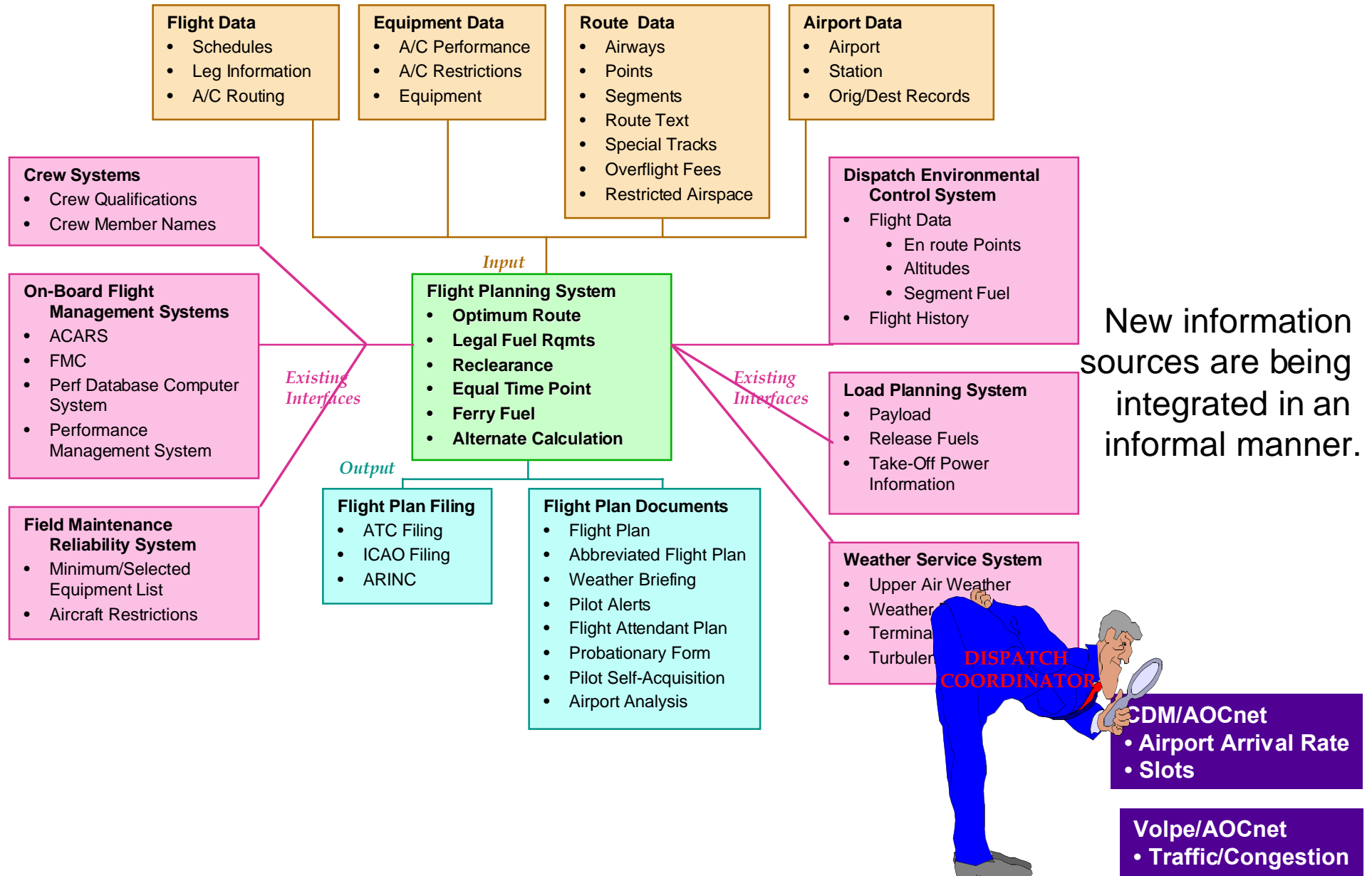
**Flights into DFW**  
**White = 0% inefficient**  
**Full red = 50% inefficient**



**Flights out of DFW**  
**White = 0% inefficient**  
**Full red = 50% inefficient**

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# Results (Ultimate Flight Planner)



# Conclusion(s)

- Replanning, as currently performed, is **not** a great source of inefficiency, but is inefficient as a process in and of itself
- **Forward (or Proactive) Replanning may be a huge opportunity for lowering Direct Operating Costs**
  - Free Flight (reaction to tactical traffic situations)
  - Coded SWAP routes (reaction to ground-based Wx initiatives)
  - GDP/CDM (reaction to ground-based traffic situations)
- **The integration of a strategic planner function has to integrate information from both airborne and multiple ground-based sources in order to maximize benefit**